



Southern Nevada Regional **Water Recycling** Study





March 2009

Dear Valued Stakeholder:

While most people in Southern Nevada recognize the importance of maximizing our Colorado River and local groundwater supplies, far fewer appreciate the critical role that water recycling plays in extending our community's water supply. If not for the ability to recycle water, Southern Nevada would have exhausted its available water resources many years ago.

Our community recycles water in two ways: direct and indirect. Direct reuse is a process by which wastewater flows are treated to stringent quality standards, then used for non-potable purposes such as irrigation. Indirect reuse, which currently represents the majority of the Las Vegas Valley's water recycling efforts, is achieved by treating wastewater to very high levels, then returning that water to Lake Mead. For each gallon of water returned, a credit of one gallon is created. Through this mechanism, we are able to stretch our water resources by billions of gallons each year.

While indirect recycling is effective, additional direct reuse offers several potential benefits, including reduced energy use for water treatment and delivery. In this report, we identify options that will allow us to expand upon our already successful water recycling program and make optimal use of our community's water resources.

The *Southern Nevada Regional Water Recycling Study* was developed with involvement and input from a diverse group of stakeholders, all of whom have a strong interest in current and future water recycling efforts. The report includes specific public policy recommendations with respect to water reuse.

The authors of this report believe that adoption of the principles and recommendations contained herein will promote the optimal use of our region's scarce water supplies. Please take the opportunity to review this document and reflect upon the recommendations. If you have any questions, please do not hesitate to contact either of us. With your guidance and support, we can protect and extend our community's most valuable resource and serve as a model for communities around the world.

A handwritten signature in blue ink, reading "Patricia Mulroy", written over a horizontal line.

Patricia Mulroy
General Manager
Southern Nevada Water Authority

A handwritten signature in blue ink, reading "Chip Maxfield, PE", written over a horizontal line.

Chip Maxfield, PE
General Manager
Clean Water Coalition

Purpose of Study

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www.snwa.com
www.cleanwatercoalition.com

Recycled water accounts for roughly 40 percent of the water used in Southern Nevada, making it our second largest water resource and a critical piece of our water resource portfolio. In this study, we take a specific look at water recycling and seek to identify new ways to extend our already successful water recycling programs while also seeking new opportunities to recycle and make better use of the water we have.



This study provides recommendations for regional policies and goals for water recycling that both complement our water conservation program and help provide water resources for continued growth in a sustainable manner. 💧

Water Terminology

To further the discussion about water recycling, it is important to have an understanding of the terms and phrases that are commonly used.

For the purposes of this study, a collection of these terms and phrases and their associated definitions is provided below:



Aquifer: A geologic formation under the ground that is saturated with groundwater and sufficiently permeable to allow movement of quantities of water to wells and springs.

Aquifer Storage and Recovery: A management strategy in which water is treated and artificially recharged to an aquifer system for later withdrawal.

Direct Potable Reuse: The introduction of reclaimed water directly into a drinking water distribution system (pipe to pipe).

Direct Reuse: The use of reclaimed water for nonpotable purposes without first discharging to a water supply source.

Graywater: Untreated used water from bathtubs, showers, bathroom sinks and clothes washers. Does not include water from toilets, kitchen sinks or dishwashers.

Indirect Reuse: The use of reclaimed water for nonpotable or potable purposes by discharging to a water supply source, such as fresh surface water or groundwater, where it mixes,

dilutes, and may be transformed before being removed for reuse.

Indirect Potable Reuse: Augmenting a community's raw water supply with reclaimed water followed by an environmental buffer. The mixed reclaimed and raw water receives additional treatment before entering the potable water distribution system.

Potable Water: Water that meets all applicable federal, state and local requirements concerning safety for drinking water.

Reclaimed Water: See "Recycled Water"

Recycled Water: Wastewater that has been treated, then used for a beneficial purpose. Also called Reclaimed Water or Reuse Water.

Water Treatment: The act of removing contaminants from source water by biological processes, chemical addition, filtration and disinfection to purify the water for its next use. 💧

All Water is Recycled - It's Just a Matter of How Fast

Water recycling is simple – it's nothing more than taking water we've already used and using it again. In fact, all water is recycled, and always has been.

Through the process of evaporation, water makes its way to mountains and rivers in the form of precipitation (rain, snow), runs over (or under) the earth's surface and back to the ocean, where it begins the process over again. Along that journey, some of this water is used by plants, animals and people, but the water is always returned to the system. If we think about the earth's water cycle as a circular process, it would represent a very large circle.

In Southern Nevada, we recycle water at a local level similar to the earth's water cycle, only smaller. Water recycling means collecting the water we've already used, treating it and using it again here in our community.

In fact, we already recycle about 40 percent of our water here in Southern Nevada with the aid of something called a

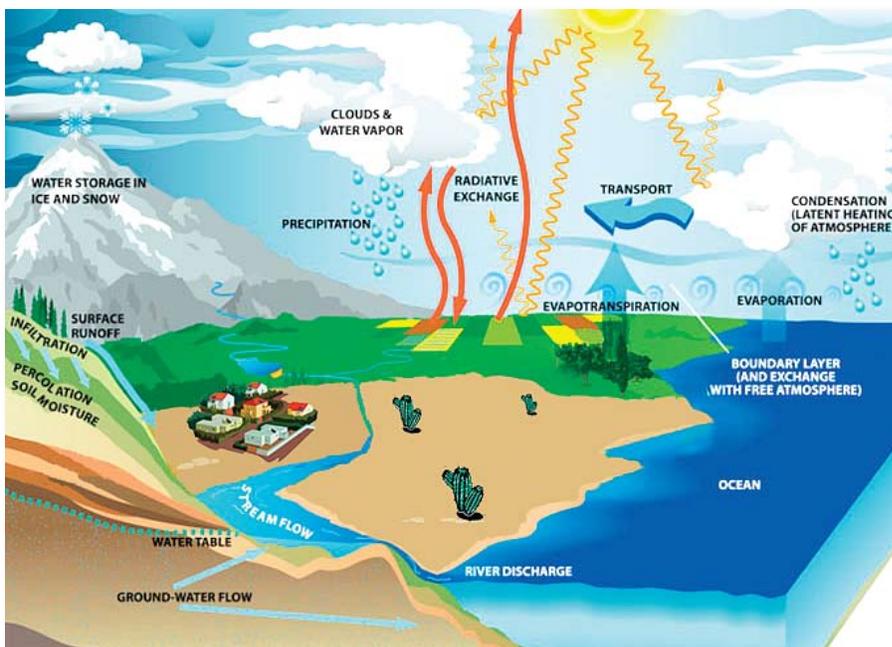
Return Flow Credit. Return flow in Southern Nevada relies on the concept that *for every gallon of treated Colorado River water returned to the Colorado River, we can withdraw and use an additional gallon beyond Nevada's base allocation.* Southern Nevada is unique among major cities that rely upon the Colorado River because our



Water recycling means collecting the water we've already used, treating it and using it again here in our community.

Las Vegas Wetlands Park

proximity to the river allows us to very efficiently recycle water through this withdrawal and return mechanism. 💧



Water Cycle

The Earth's water is constantly being recycled.

Water Quality

The Right Quality for the Right Use

What is “water quality” and how does it affect how we meet our needs?

Water quality is a term used to describe the characteristics of water in relation to its intended use. Even though the “water” part from every source is the same, water quality varies depending upon the unique biological and chemical characteristics contained in each different water source. The quality of water varies depending on what that source contains besides just water. Regardless of the source, the water we use is treated to ensure that it meets specific federal and state water quality requirements .

For instance, our drinking water is treated by processes specifically designed for the water quality of our local source

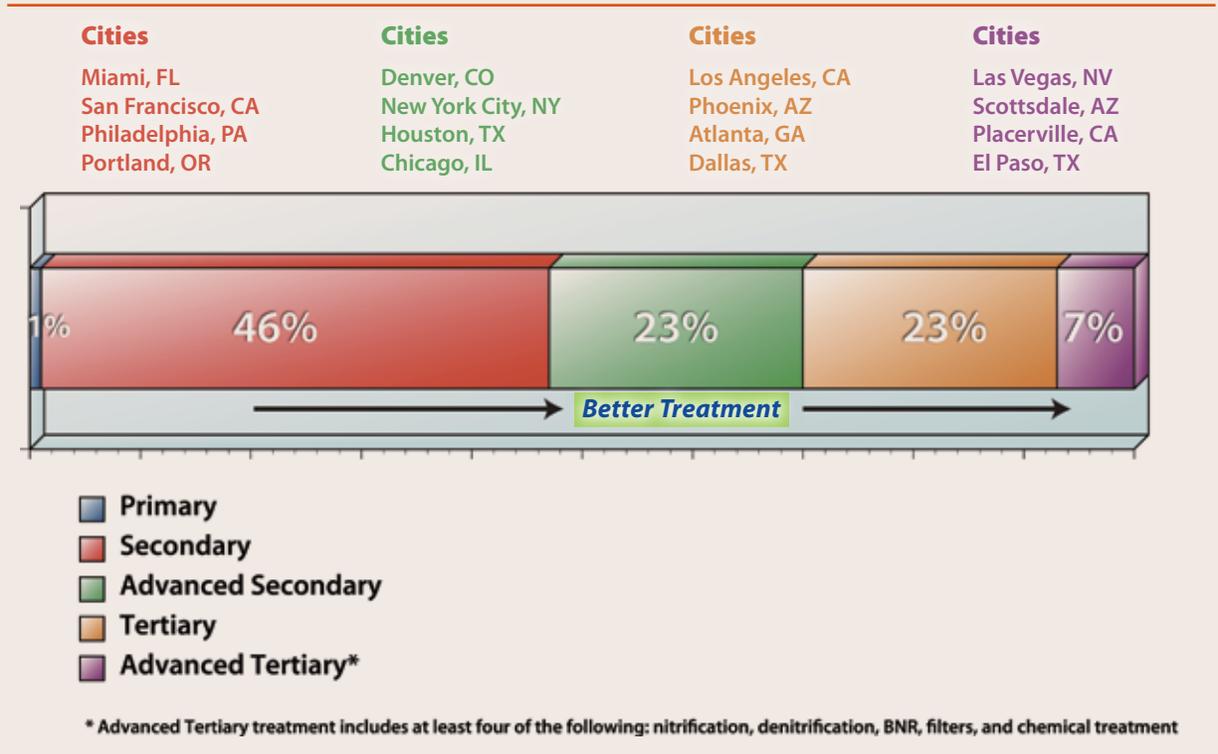
Treatment plants receive water and treat it to a level that is appropriate for its next use.

waters to ensure that it meets or exceed all federal and state requirements for drinking water.

Similarly, our wastewater is treated in multiple steps before it is returned to the environment. In Southern Nevada, the wastewater treatment

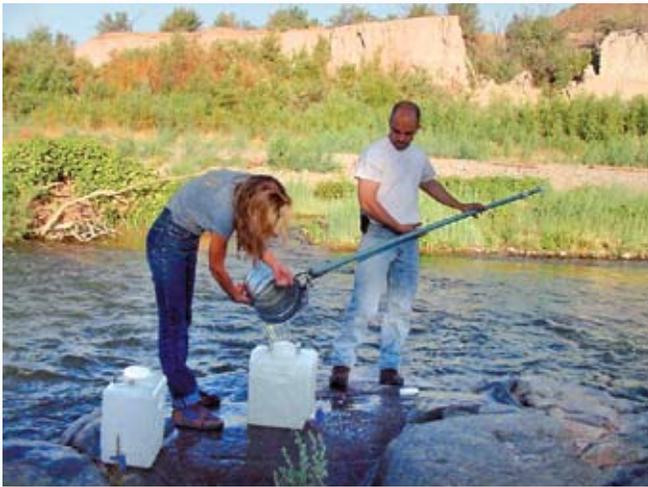
plants are among the best in the country, combining biological treatment, nutrient removal, chemical treatment, filtration, disinfection and neutralization of any added chemicals. This recycled water consistently satisfies all federal and state water quality requirements for its next use. Sometimes this next use is the irrigation of parks, golf courses or industrial uses. Recycled water not used for these needs is returned to the Colorado River system where it is available for our use and by others in Arizona, California and Mexico. 💧

Our Level of Wastewater Treatment



Water Quality Monitoring and Testing Ensures Public Safety

Between the various agencies responsible for managing our water quality, hundreds of thousands of tests* are run on our water each year in its various stages of use, treatment and reuse. This continuous monitoring and testing helps protect our water quality and the public's health and safety.



Recycled water on its way to the Colorado River is sampled and tested to protect water quality in the river.

Recycled water that is directly reused or returned to the Colorado River is tested by Nevada Division of Environmental Projection (NDEP) certified testing laboratories to ensure that it meets requirements set forth for "beneficial uses." Beneficial uses include such things as recreation, aquatic life, fisheries, irrigation, and source water for drinking water supply. The Environmental Protection Agency and the NDEP monitor the results of the tests.

Similarly, water drawn from the Colorado River is tested before and after treatment, as well as at multiple points within the potable water distribution system. This ensures that it meets or exceeds the standards of the Federal Safe Drinking Water Act.



Water drawn from the Colorado River is tested before and after treatment.

And at every point in the cycle, the people who are responsible for treating the water, testing its quality and overseeing the process are certified operators and lab analysts, licensed professional engineers, or other similarly qualified professionals whose primary responsibility is the safety of our water and the protection of the environment. 💧



Continuous monitoring and testing helps protect our water quality and the public's health and safety.

**The water supply is analyzed for metals and inorganic compounds, radiological constituents, bacteria, viruses, protozoans (such as Cryptosporidium and Giardia) and organic compounds.*

Sustainability

With today's increased environmental awareness and a strong shift in values toward more sustainable living practices, communities everywhere are reevaluating how they use their resources.

In Southern Nevada, we also recognize that as we satisfy our present needs, we must do so in a way that does not compromise the future of our community.

What does it mean to be sustainable? Most people associate it with protecting the environment. And while it does focus on environmental protection, sustainability also takes in economic and social/cultural considerations. A sustainable solution is one that represents a good balance between these three concerns. In the context of water recycling, sustainable applications for its use are evaluated in this same way. Water managers look for

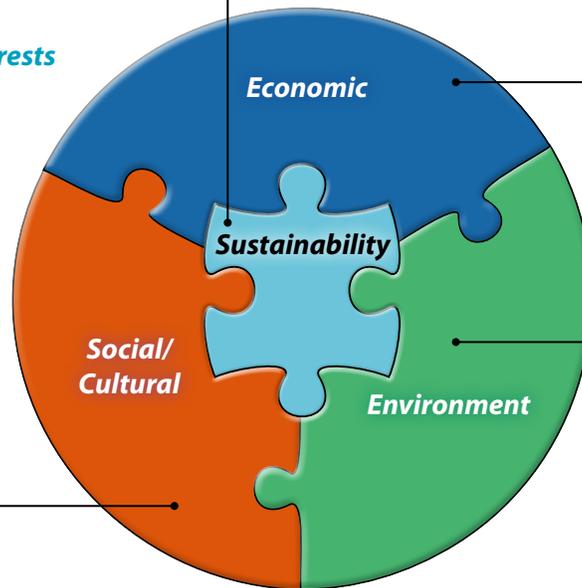


While it does focus on environmental protection, sustainability also takes in economic and social/cultural considerations.

opportunities to use recycled water cost effectively and in ways where our treatment processes can effectively achieve a high quality of water. When used in the right applications, recycled water can save energy, reduce the need for new infrastructure, and in some instances result in an increase in the water supply available to a community. 💧

Sustainability

Sustainable solutions balance competing interests



Economic

Economic

*Growth and Development
Job Creation*

**Social/
Cultural**

Social/Cultural

*Quality of Life
Community Perception
Social Values/Priorities*

Environment

Environment

*Pollution Prevention
Habitat Conservation
Resource Protection*

Setting **Recycling Goals** for the Future

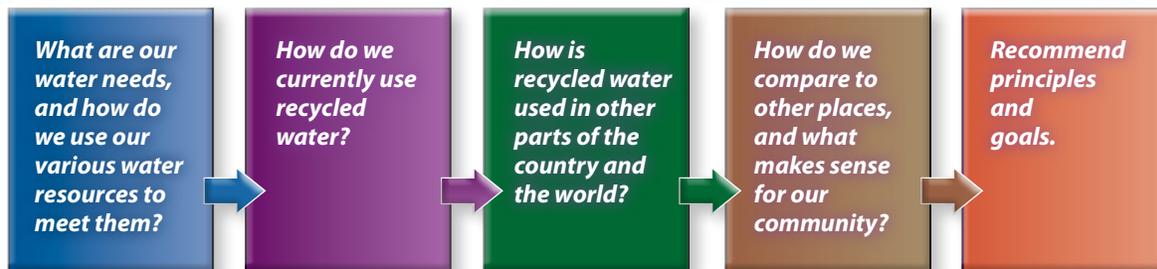
The Big Picture

Our water resource picture is changing. The effects of prolonged drought within the Colorado River basin are causing stress on water resources throughout the entire region. And the difficulties caused by this water scarcity are unlikely to go away anytime soon. Most experts believe that the earth's climate is changing, and that one of the effects of this climate change is the reduction in precipitation making its way into the lakes and rivers of the Colorado River basin.

While no one knows for certain what the future holds, we must find ways to make all of our water resources go further. Now is the time to look at how we collectively use our shared resources and use the opportunity to set new goals for using recycled water. 💧



The effects of prolonged drought within the Colorado River basin are causing stress on water resources throughout the entire region.



The Study Process

In order to provide the background needed for an informed discussion about how we use water and how recycled water should fit into our future, this study utilized a multi-step process.

Current Water Resources and Use

Where Our Water Comes From and How We Use It

In order to make good decisions and set goals for using recycled water, we need to know something about how

Recycled water provides nearly 40 percent of our total water resources.

our water fulfills our needs. So where does our water come from, and how do we use it?

Almost all of the water we use in Southern Nevada (nearly 90 percent)

comes from the Colorado River, with the rest coming from groundwater wells. When we factor in the amount of recycled water we use in Southern Nevada, we see that it makes up nearly 40 percent of our total water resources.

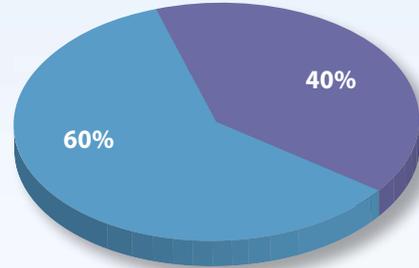
How do we use the water we have?

Most of the water used in Southern Nevada is used at our homes and most of that is used outdoors. If we look beyond the water used at our homes, the remaining water is used by companies and for services that support our local economy and quality of life.

How do the various uses we have for water help us shape our water recycling goals?

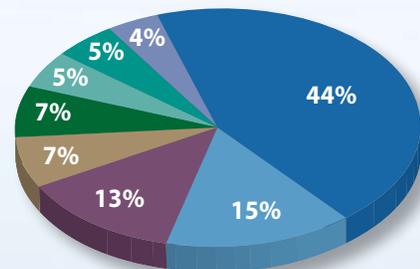
The answer lies in our ability to collect water from these different uses so it can be treated and used again. If we use the water in ways that allow us to capture it after use (indoor uses that send water “down the drain”) then we can recycle it. But if the water can’t be captured after we’ve used it the first time (such as outdoor irrigation) then we can’t recycle it. 💧

Water Resources



- Surface and Groundwater
- Recycled Water

Water Use



- Residential (Single Family)
- Residential (Multi-Family)
- Commercial / Industrial
- Resorts
- Golf Courses
- Schools / Government / Parks
- Common Areas
- Other

Water Recycling Today

Our Current Water Recycling Practices

Did you know that we have been recycling water in Southern Nevada for over half a century and for over 20 years it has been a part of our strategic water resource plan?

Most of the water that goes down our drains (sinks, showers, toilets) is ultimately returned to the Colorado River, but not until it has been treated and tested to make sure that it is clean enough to be returned to the water cycle (refer to the water cycle on page 3). But some of the water that has been treated comes back to our community (without going to the river) for beneficial use. **While we don't use this recycled water for drinking, we are able to use it to meet many of our other water needs.**

Recycled water is currently used for golf course, green belt and median irrigation, cooling water for power plants, water for dust control, and other minor uses. And it is important to note that while many of our golf courses use recycled water, not all do. The same is true for the other applications in which we use recycled water – a combination of recycled water and potable waters are used to meet their overall needs. Some water needs are minimized through conservation as well.



Approximate Annual Volume of Indirect Water Recycling – 186,000 acre-feet

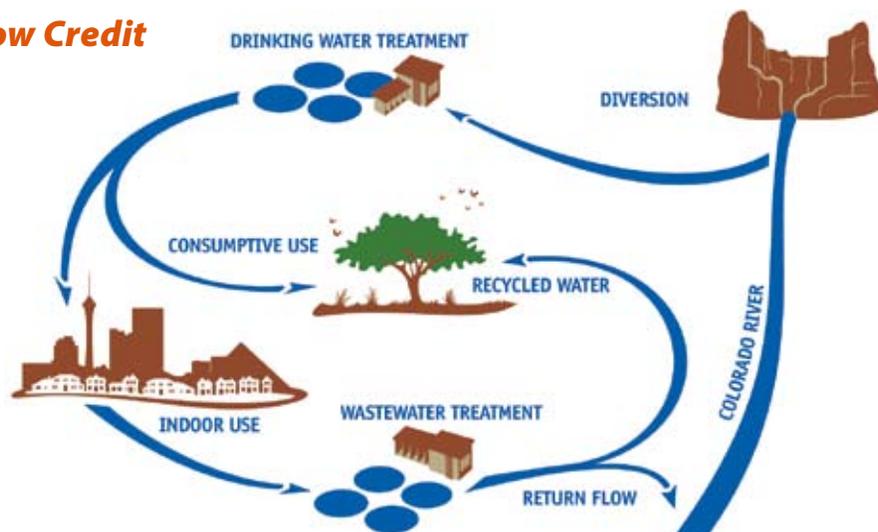
Approximate Annual Volume of Direct Water Recycling – 27,000 acre-feet

Golf Courses Irrigated with Recycled Water – 30

Power Plants Using Recycled Water for Cooling – 2

In the end, how we satisfy each need for water is not a one-size fits all process, but rather a decision that balances cost, resource availability, water quality and other factors to come up with the best answer for that water need in that community. **How do we strike this balance?** That's where setting goals comes in, and we'll get to that later in this report. 💧

Return Flow Credit



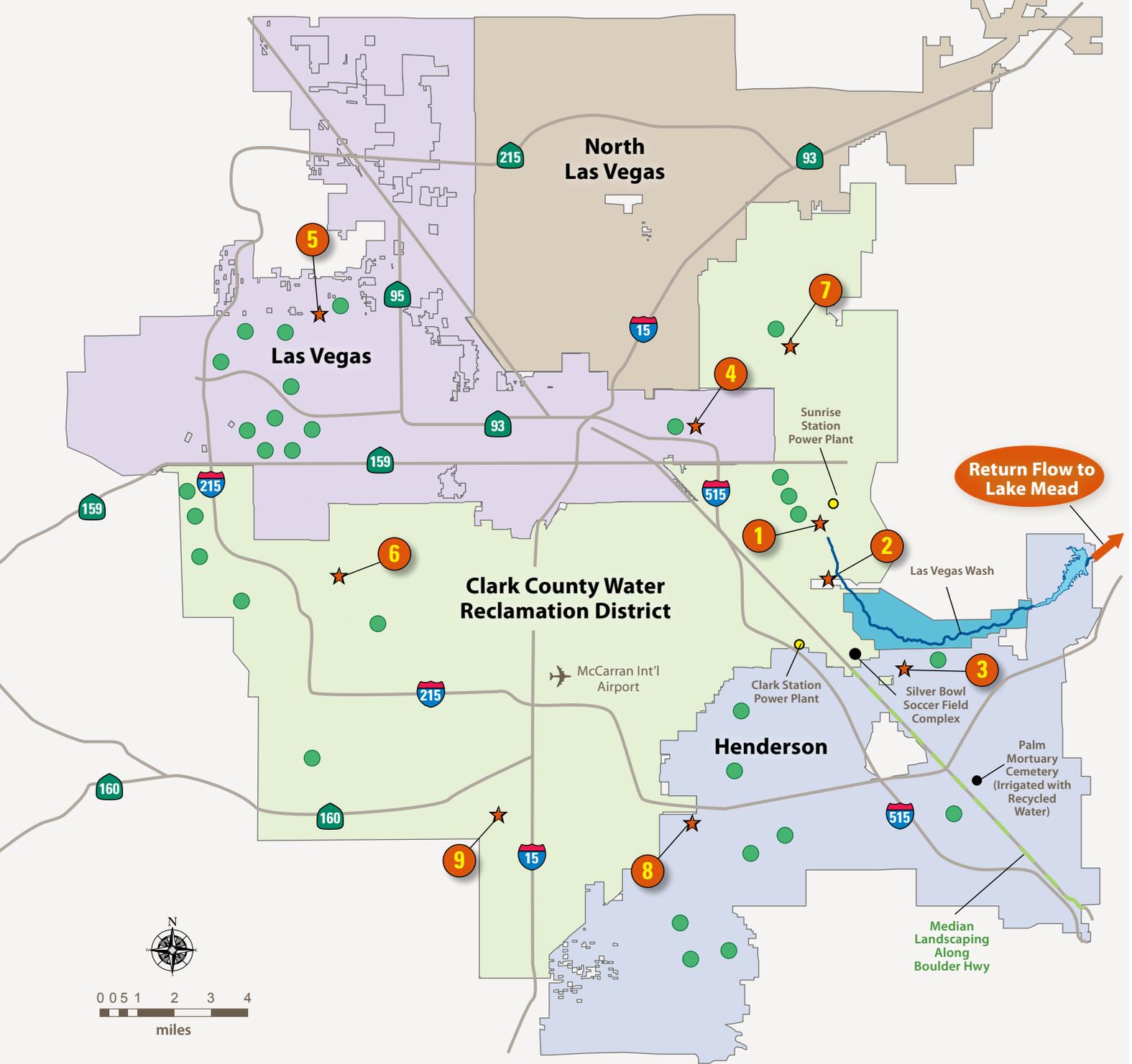
Las Vegas Valley Treatment Plants and Recycling Sites

Water recycling is a key component of Southern Nevada’s strategic plan for the region’s water resources.

	Facility	Capacity (mgd)	Primary Use
1	City of Las Vegas Water Pollution Control Facility	91	Return to Colorado River, golf courses, power plant cooling, construction water
2	Clark County Water Reclamation District	110	Return to Colorado River, golf courses, wetlands park power plant cooling, Silver Bowl Park, streetscape
3	City of Henderson Kurt R. Segler Water Reclamation Facility	32	Return to Colorado River, golf courses, construction water, median irrigation, cemetery irrigation
4	City of Las Vegas Bonanza Mojave Water Reclamation Facility	1	Golf courses
5	City of Las Vegas Durango Hills Water Resource Center	10	Golf courses
6	Clark County Water Reclamation District Desert Breeze Water Resource Center	5	Golf courses, public park
7	City of North Las Vegas Water Reclamation Facility (Future)	25-50	Return to Colorado River, golf courses, industrial uses
8	City of Henderson Southwest Water Reclamation Facility (Future)	8-16	Golf courses, construction water, median irrigation
9	Clark County Water Reclamation District Enterprise Water Resource Center (Future)	15-25	Return to Colorado River, golf courses, median irrigation

Legend

- ★ Treatment Plants
- Power Plants
- Wetlands Park
- Golf Courses that currently use reclaimed water (30)
- City of Henderson
- City of North Las Vegas
- City of Las Vegas
- Clark County Water Reclamation District Service Area



How is Recycled Water Used Elsewhere?

In Some Places, Water Recycling May Not Be the Best Answer

Water recycling is often more expensive than treating and discharging wastewater and relying on non-recycled sources to meet water needs. Communities that have an abundance of water resources that exceed their needs often don't recycle, primarily because the cost of building and operating the treatment and distribution systems required to supply recycled water just isn't justified.

Many Communities Use Recycled Water for Irrigation

The single most common use for recycled water is for outdoor irrigation. The typical water customer who buys recycled water for irrigation uses it to water golf courses, public median landscapes, and certain types of agriculture. While the recycled water treated for irrigation is not suitable for drinking, the water needs of many plants can be satisfied by recycled water as long as carefully managed watering practices are in place.



The typical water customer who buys recycled water for irrigation uses it to water golf courses, public median landscapes, and certain types of agriculture.



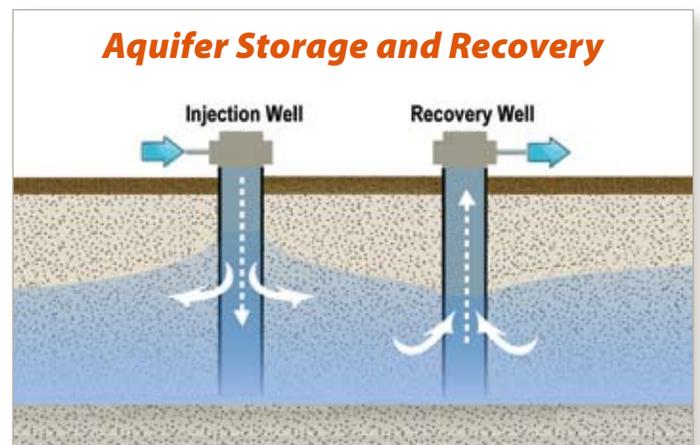
Silver Bowl Park

School and Parks

Using recycled water for irrigating landscaping at schools, ball fields and parks is given careful consideration because of the increased potential for human contact with the recycled water. However, extensive study and many years of use at schools and parks in other communities show that this is a responsible use of recycled water. Because recycled water for irrigation is not treated to a potable standard, signage and specially colored piping and sprinkler heads identify it as recycled and instruct people not to drink it.

Recycled Water Can Be Used to Supplement Groundwater

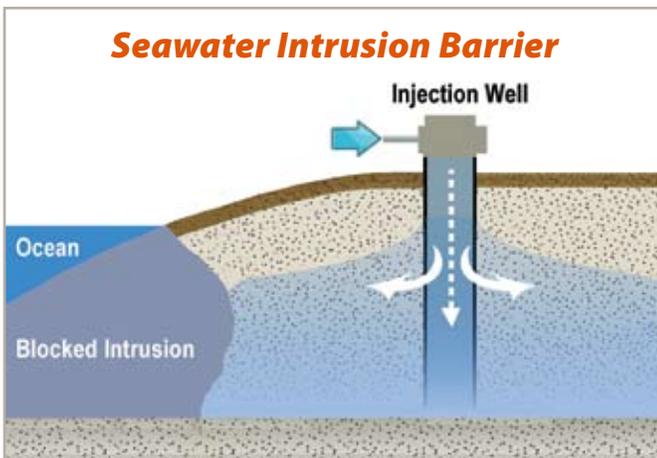
In some communities, the groundwater aquifer is their main water resource. They draw the groundwater from wells and use it to meet the community water needs. But where groundwater supplies are limited, and when the need for groundwater exceeds what can be replenished naturally, recycled water can be used to replenish the groundwater supply and help these communities maximize their groundwater resources.



How is Recycled Water Used Elsewhere?

Prevention of Seawater Intrusion Into Potable Aquifers

For coastal communities that rely heavily on groundwater, pumping groundwater from aquifers near the ocean can result in a lowering of the water table and an influx of seawater into the same aquifers they rely on for drinking



water. In these communities recycled water injected into the ground can help increase groundwater pressure and prevent the migration of seawater into the potable aquifer.

Industrial Uses

Many businesses use water for manufacturing and industrial processes, and for some of these uses, recycled water is a viable option to meet their needs. **Common**

industrial uses for recycled water include evaporative cooling towers, washing of aggregates for concrete, soil compaction and dust control, commercial laundries and car washes. For industrial uses, the specific water quality requirements for each use are evaluated, and requirements for supplemental treatment (if needed) are identified.



Recycled Water can be used to satisfy industrial cooling water needs.

Indirect Potable Reuse

Southern Nevada is one of many communities that indirectly augment drinking water supplies with recycled water. While our current efforts augment our surface water supply (the Colorado River), some communities use recycled water to stretch surface and/or groundwater supplies. Other examples include Orange County, California, the greater Denver metropolitan area that includes Aurora, Colorado, and Atlanta, Georgia. Indirect Potable Reuse is practiced internationally as well. Singapore's national water agency currently fulfills 15 percent of total water demands with recycled water, with a small proportion of this percentage contributing to indirect potable reuse.

Recycled water is used in Southern Nevada to supplement surface water supplies as Indirect Potable Reuse.

Direct Potable Reuse

At the most aggressive end of the water recycling spectrum is the concept of taking recycled water, treating it to the same potable standards that would apply to any other source water, and then placing it directly into a potable water distribution system without the benefit of buffering or dilution from another body of water. Because of the increased public health risk and public perception difficulties associated with such an

approach, direct potable reuse applications are extraordinarily rare, and are not permitted by state or federal regulations in the United States. In fact, only one documented instance of a municipal water system utilizing this approach could be identified — Windhoek, Namibia. 💧

Recycling Practices Vary by Community

Different Places, Different Practices



If you look at the range of water recycling practices used elsewhere, and then compare them with the water recycling practices we currently use in Southern Nevada, you'll notice some differences.

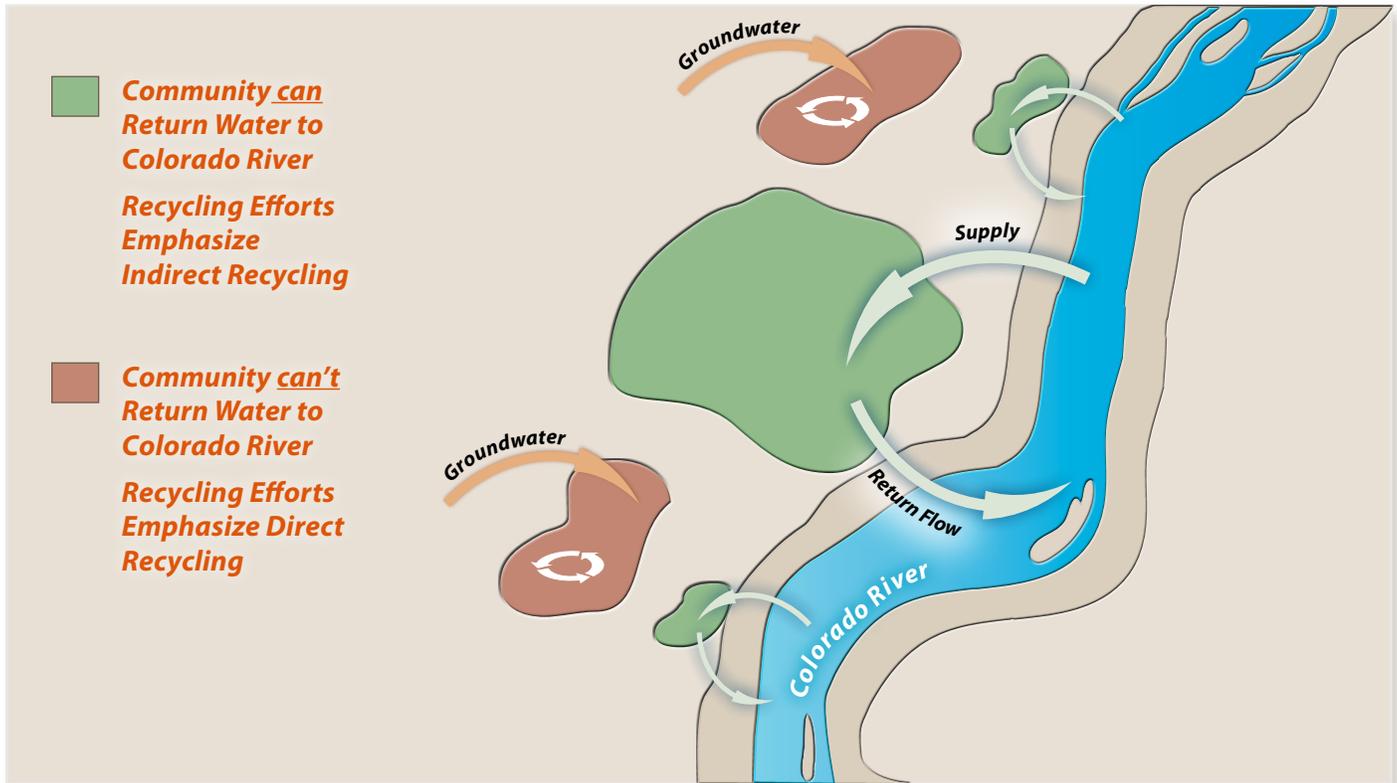
Why do recycled water use practices differ from place to place? Simple – the water recycling practices each area uses are balanced responses

to the water needs, available supplies, water rights/regulatory framework and the costs associated with meeting the water needs of these individual communities.

Because the constraints and challenges of supplying water to these various communities are different, the water recycling practices adopted may differ as well.

Even within Southern Nevada, recycling practices vary for the individual communities in the region. For instance, most of our communities are located such that they can recycle water indirectly via return flow to the Colorado River. But for those communities where return flow to the Colorado River is impractical, a different set of recycled water priorities may be in order. The inability to return recycled water to the Colorado in these communities places a greater value on direct uses of recycled water such as irrigation and industrial uses, and offers the opportunity to engage in other forms of indirect recycling such as Aquifer Storage and Recovery. 💧

Southern Nevada's Constraints and Challenges Vary with the Region



What About **Graywater**?

Graywater and Recycled Water Are Not the Same

Both graywater and recycled water have a common idea behind them, which is to use water more than once. But if you look back to the definitions from page 2, you'll see there is a critical difference. Recycled water has been treated to a high standard to make it safe for many uses, whereas graywater receives no treatment at all.

A recent publication from the World Health Organization noted the potential implications of graywater on public health. Because graywater has the potential to transmit disease,

“As graywater is contaminated with fecal coliforms [an indicator of fecal contamination] and some chemical pollutants from bathing and laundry, microbial and chemical contamination of graywater poses a potential risk to human health, and so it is important to recognize that graywater does have the potential to transmit disease.”

— *Overview of Graywater Management Health Considerations, World Health Organization, 2006.*

graywater systems are typically required to be designed to avoid human contact through the use of subsurface irrigation systems. This potential risk of disease is accepted in some communities as the trade-off for the reduced demand on their water supply. In Southern Nevada, however, graywater use would not reduce demand on our water supplies since our current practice of recycling it returns the water to our supply source. In either case, graywater users don't use less water than non-graywater users. Since the graywater

Recycled water has been treated to a high standard to make it safe for many uses, whereas graywater receives no treatment at all.

used would have otherwise been sent to a wastewater treatment facility and recycled, no water is saved. In fact, a recent analysis of water use data for graywater users in Western Australia yielded data that indicates just the opposite. Data showed that homeowners who installed a graywater reuse system and subsurface irrigation system actually increased domestic water consumption. More investigation is planned by Australian water managers to understand the reasons underlying this surprising result, but they currently suspect that homeowners are rationalizing that they can use more potable water because they are “making” irrigation water.

Our current potable and recycled water practices yield the same or better use of the water while avoiding the potential human health risks associated with graywater. 💧

“The rebates for alternative water sources... appear to be very effective. The exception appears to be graywater reuse systems that are associated with an increase in consumption of scheme water.”

— *Waterwise Rebate Scheme Review 2007, Data Analysis Australia Pty Ltd, April 2008.*



Community Leaders Weigh In

To understand the values, priorities and concerns of Southern Nevadans about how we use water and how recycled water fits into the picture, face-to-face interviews



with 49 community leaders were conducted. **The community leaders interviewed included representatives from government, development, business, green industry and others.** As a part of the interviews, a short overview of water resource issues relevant to Southern Nevada was provided, which was then followed by a 19-question, open-ended survey to gauge views on various water issues in our community. This survey and its results can be found on both the SNWA and CWC websites.

While an in-depth analysis of the interview results and surveys would be too lengthy to include in this study, several strong themes were evident in the discussions.

Safety of Recycled Water

Safety was one of the most prevalent themes found across the various opinions of the community leaders. Because recycled water is made by treating wastewater, multiple measures are in place to protect public health. Nevada has strict regulatory controls that govern the production and use of recycled water. Local agencies are responsible to see that the public

Seventy-nine percent of those interviewed thought health and safety would be one of the greatest challenges in utilizing graywater systems.



health and safety is protected through adherence to these regulations. There have been no documented cases of human illness in Southern Nevada caused by contact with recycled water.

Cost/Benefit of Recycled Water

When asked various questions related to the expansion of recycling practices to meet certain water needs in Southern Nevada, one of the prevalent themes voiced by most participants was the cost of the recycled water in comparison to the benefits it offers. Most participants felt that if recycled water was a cost-effective means to meet certain water needs when compared to other water sources, then its use could be expanded and still represent a net benefit to the community.

Health and Safety of Graywater

Ninety percent of the people interviewed felt that our current systems of potable and recycled water were more beneficial than graywater systems. Because graywater is untreated, it contains pathogens and contaminants that pose a public health risk, and this potential risk to public health and safety was central to the discussions and concerns on

graywater. Recent developments among builders who specialize in sustainable building practices have led to proposals to incorporate graywater systems in homes and major commercial developments, but graywater systems are currently not permitted by Southern Nevada building codes. Seventy-nine percent of those interviewed thought health and safety would be one of the greatest challenges in utilizing graywater systems.

Return Flow Credits – Important but Misunderstood

The importance of the Return Flow Credit as a means of indirect recycling was an issue emphasized by many of the community leaders interviewed. They spoke to the value of indirect water recycling practices that the return flow credit supports, and noted the economy of this system's opportunity to allow for water recycling without the cost of parallel recycled water infrastructure. Only 18 percent of



those interviewed thought that direct recycling applications should be pursued more aggressively at the expense of indirect recycling.

But they also offered the opinion that the return flow credit concept, key to how we manage water here in Southern Nevada, may be misunderstood by many of our residents, and could be an important topic for future community outreach efforts.

Public Outreach Needed to Help Community's Understanding

A common theme heard from community leaders was the desire to provide the residents of Southern Nevada with the information needed to understand many of the same issues discussed in this study. ***Where does our water come from? How do we use it? What choices do we have and how might these choices impact our communities?*** Some suggested that such a program include concepts of desert living, a description of how the water cycle in Southern Nevada works, and be targeted to multiple audiences that would include school children, homeowners, business and industry.

Aggressive Programs to Protect Water Quality and Supply

Protecting the quantity and quality of our water supplies was a theme heard from most participants in this process.

These community leaders were engaged in discussions of specific challenges and opportunities within the questions the study team presented, but many of them also (at some point or another during the interview) would make the following point:



Don't stop here – if more aggressive programs to protect and ensure the regions water supply and water quality are needed, we'll support them. 💧

Guiding Principles for Water Recycling

Goals Need a Sustainable Framework

Since one of the key objectives of this study is the establishment of goals for future water recycling practices in Southern Nevada, we need to define the guiding principles that any such goals would follow. With the insight provided through interaction with community leaders, we have the ability to establish principles that can be adopted by the entities who manage our water resources.

Taken together, these principles provide a framework rooted in sustainability for establishment of water recycling goals. And because these principles speak to the values of the community, they are robust enough to help us make good decisions about recycled water in the future when our circumstances (how we use water, how much water we have, etc.) may be different than they are today. 💧

Guiding Principles:

Recycled Water resources should be developed and used in applications that are:

Safe

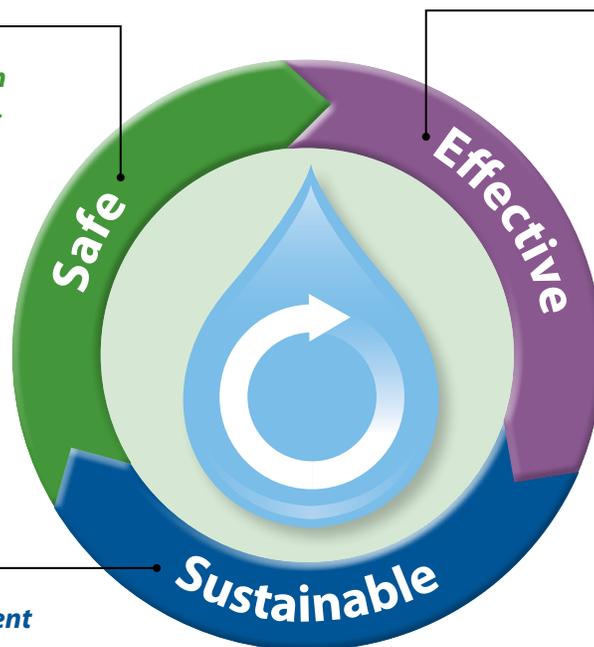
Treated to provide a high degree of assurance that public health and safety is safeguarded.

Effective

Shown to be an effective means of maximizing the water resources available to Southern Nevada.

Sustainable

Demonstrated to represent the best balance of the environmental, economic, and social/cultural benefits.



With a set of principles in place that will result in balanced choices for our communities, we developed a menu of recycled water options that make sense for Southern Nevada. They include:

Recycled Water Menu

- **Indirect Reuse as Return Flow**
Use of recycled water via discharge to the Colorado River and subsequent reuse in Southern Nevada has been in practice for nearly 40 years, and remains one of the most effective types of recycled water use available to our community.
- **Public/Commercial Landscape Irrigation**
This would include irrigation of public medians, landscaping around public or commercial buildings. Some public and commercial landscapes and medians in Southern Nevada already use recycled water.
- **Golf Course Irrigation**
Representing the majority of directly recycled water use in Southern Nevada, golf course use is a proven, successful practice.
- **School Yard Irrigation**
While recycled water is not currently used for irrigation at schools in Southern Nevada, use could be expanded to schools if supported by local communities.
- **Park Irrigation**
Use of recycled water at public parks in Southern Nevada is limited, and use could be expanded to more parks if supported by local communities.
- **Industrial Uses**
Use of recycled water for power plant cooling, dust control and construction water is already practiced in Southern Nevada. Additional potential industrial uses for recycled water may be viable in Southern Nevada.
- **Aquifer Storage and Recovery**
Use of recycled water to supplement existing groundwater supplies has recently been provided for by changes to Nevada regulations. Use of recycled water for this purpose could be developed if supported by local communities.

Recommendations

Applying the guiding principles and considering the many uses for recycled water, seven recommendations are offered:

1 Expand return flow to the Colorado River to increase Nevada's credit for subsequent withdrawal.

We already recycle roughly 40 percent of the all the water we use in Southern Nevada by returning it to the Colorado River for use again. Continuing efforts to reduce irrigation uses (which cannot be captured or recycled) mean that an increasing proportion of our water is available for indoor uses that can be captured and recycled. This practice is safe, has been practiced in Southern Nevada for over half a century, maximizes our water resources, and makes good use of existing infrastructure. By taking measures to expand this practice, we can gain further benefit from a limited resource while safeguarding the environment.

2 Expand the use of Recycled Water in the Las Vegas Valley where large turf and industrial demands exist.

The use of recycled water to fulfill the needs of large turf irrigation and industrial applications are the most common direct water recycling applications in practice today. The technologies and practices to use recycled water for these needs are proven and more than adequate to protect public health and safety. Though the use of recycled water for these needs does not lessen the demand on Southern Nevada's water resources overall, sustainable uses of this type for recycled water can still offer a net benefit to the public. Such benefits may include energy savings, decreased demand for new infrastructure, and reductions in the nutrients being added to the Colorado River.

3 Maximize the use of Recycled Water in areas of Southern Nevada where return flow to the Colorado River system is not practical, including the testing of aquifer storage and recovery.

The geography of Southern Nevada is such that not all of our communities are able to return recycled water to the Colorado River. In communities where indirect recycling is impractical, direct water recycling becomes even more valuable since it has the effect of increasing the water supply. And in order to make water recycling more efficient and cost effective in these same communities, testing of an indirect method such as aquifer storage and recovery is recommended.

4 Develop a Salt Management Strategy to address the accumulation of salts that are detrimental in Recycled Water.

One of the side effects of the use of recycled water is the accumulation of salts in the ground. Because our recycled water has a concentration of total dissolved solids (TDS – a means of measuring salt concentration) that is roughly twice that of Colorado River water, using recycled water for irrigation (our most common use) can be detrimental to the very plants we are trying to support. Further, the very successful conservation programs used in Southern Nevada have reduced indoor water use which also contributes to higher TDS. The development and adoption of a regional Salt Management Strategy could eliminate barriers to further use of recycled water.

Recommendations

5 Continue to advance the research of the health and safety implications of Recycled Water.

The safety of public water systems is understandably one of often voiced concerns when discussing the use of recycled water. And because recycled water has been a resource drawn on by communities across the globe for many years, a significant body of research has led to well-tested regulations and best practices for recycled water use. But as the science of water quality continues to improve, opportunities to advance the research on the health and safety implications of recycled water continue to be identified.

6 Prohibit the use of treated or untreated Graywater in the Las Vegas Valley, and prohibit its use outside of the valley where there is reasonable potential for return flow to the Colorado River system or other Water Recycling programs.

As it stands today, graywater systems are not permitted in Clark County. Unlike recycled water, which is highly treated and regulated, graywater receives no treatment, which introduces the potential to transmit disease. Further, because Southern Nevada has the ability to recycle water both directly and indirectly, the use of graywater would not result in water savings. Southern Nevada water managers will continue to promote and regulate water quality and efficiency measures in homes and businesses.

7 Educate the public about our local water cycle and the benefits of Recycled Water.

An informed public is better able to participate in public policy discussions and decision making processes, but much of the discussion about water resources in Southern Nevada requires knowledge that our residents may not have. Community leaders interviewed as a part of this study share our desire to educate the community about recycled water. A public outreach effort to provide the residents of Southern Nevada with the information needed to understand our local water cycle and how reclaimed water is a part of that cycle would be a benefit to the community.

Conclusion:



The recommendations offered in this study support Southern Nevada’s existing recycled water programs and offer opportunities to expand them as well as to promote new recycled water uses. These recommendations and the guiding principles that support them are complementary to the region’s conservation efforts and provide sustainable solutions to make the best use of Southern Nevada’s water resources. Through these practices, and through continued efforts to involve Southern Nevadans in the discussion of our water resources and how best to use them, we can maintain the reliable water supply that has helped make our community a great place to live.



Want More Information?

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This Study was commissioned by the Southern Nevada Water Authority and the Clean Water Coalition. It was conducted by Black & Veatch, a global water resources and engineering firm, and supported by a group of subconsultants and subject matter experts. The study began in late 2007 and was completed in early 2009.



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